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ABSTRACT

This study examined the relationship between five stress factors (faculty role, administrative relationship, role ambiguity, perceived expectations, and administrative task) and specific personal, positional, and organizational variables in relation to their effect on the roles of department chairpersons. Using a chair stress index, administrative role questionnaire, chair task inventory, general information questionnaire, and an organizational and departmental ratings questionnaire, 523 department chairs at research and doctorate-granting universities throughout the United States were surveyed. The study found that the less role ambiguity as well as role conflict, and the more satisfaction chairs derived from their position, the less stress they tended to experience. Chairpersons who rated their institutions highly experienced lower levels of faculty role stress, administrative relationship stress, role ambiguity stress, and administrative task stress than chairs who did not. Multiple regression analysis showed that three independent variables (intrinsic reasons for accepting the position, total satisfaction with the position, and role conflict) had a significant role on faculty role stress. Age, years of experience, and gender were found to have little effect on chairperson stress. (Contains 86 references.) (MDM)

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The Stressful Journey of the Department Chair: An Academic in Need of a Compass and Clock

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The Stressful Journey of the Department Chair:

An Academic in Need of a Compass and Clock

What I dream of is an art of balance, of purity and serenity devoid of troubling or depressing subject matter . . . a soothing, calming influence on the mind, something like a good armchair which provides relaxation from physical fatigue.

Henri Matisse

Department chairs hold the classic middle-of-the-road position. The position of chair is viewed differently by faculty, deans, students, and department chairs themselves. First, faculty often view the department chair as a peer who sacrificially subordinates the primary professional responsibilities (teaching, research and writing) to temporarily journey to serve his or her colleagues by performing essential departmental administrative tasks. This sacrificial journey is made so other faculty members can pursue their teaching, research and writing interests unencumbered by administrative details. Second, chairs academic interests turn them firmly towards the department faculty, but their leadership of the department depends largely on directions from the dean. Third, students believe chairs to be their advocate when problems with faculty arise. Finally, views of department chairs toward the position vary by their personal characteristics and situational contexts.

The aggregation of participants with differing views on the position places multiple, conflicting, and consequential demands upon chairs. For example, scholarship plays an important part of the department chair's role in all institutions. The definition of the chair's "scholar" role may vary from institution to institution. However, the work of administration and

scholarship do not make good bedfellows since the conditions needed to create scholarship and administration are different. Chairs are trapped between the stresses and pressures of performing not only in their administrative roles but the scholarly one as well. The dual pressure in the chair position were reconfirmed when comparing the most serious stressors of chairs with those of faculty. In two studies (1984, 1990) conducted by the *Center for the Study of the Department Chair* (CSDC), of 1200 faculty and 800 chairs respectively, almost 60 percent of the chairs suffered from "heavy workloads" (Gmelch & Burns, 1993) compared to 40 percent of the faculty (Gmelch, Lovrich & Wilke, 1984). Not only do chairs retain the highest faculty stressors from scholarship while holding the chair position, they also add managerial pressures. This paradoxical situation of traveling two roads simultaneously causes many chairs to burn out from the strain of trying to be an effective administrator and productive scholar (Gmelch & Miskin, 1995). Many chairs lack the time and commitment to complete the journey (Seedorf, 1990; Wentz, 1995), ending in unresolvable conflicting directions and confounding fatigue and stress (Gmelch & Burns, 1994).

In an attempt to understand in greater detail the nature of stress experienced by chairs, Burns and Gmelch (1992) analyzed 43 work-related situations and through factor analysis identified five stress factors: faculty role; administrative relationship, role ambiguity, perceived expectations, and administrative task. This study seeks to continue this vain of research through determining the nature of the association between these five stress factors and specific personal, positional, and organizational variables identified by the literature as significant to the roles of chairs, or as related to stress experienced by chairs.

Theoretical Foundation for the Department Chair's Stressful Journey

Stress has been the subject of hundreds of research studies over the last 30 years. In the literature, stress has been defined in numerous ways, which in turn have generated various research methodologies to examine it. A four-component stress research paradigm, suggested by McGrath (1976) has guided many of the stress investigations by social scientists over the last two decades. Expanding on McGrath's four stages of stress, a stress cycle for managers was developed, and refined into a stress cycle for professionals in higher education (Gmelch 1982, 1993). In the higher education stress cycle, *Stage I* is concerned with the **identification of stressors** present in the environment. Examples of stressors include excessive meetings, frequent interruptions, confrontations and other environmental factors. In *Stage II* the **individual's perception** of the demands from the environmental stressors determine how much stress is experienced. The **individual's stress response** is *Stage III* of the stress cycle. Coping with stress is associated with the individual's perception of available resources to meet the demands of the stressor. Whether an individual is able to muster resources to cope with stress demands is part of the stress response. To complete the stress cycle, *Stage IV* is termed the **consequences** of the response to stress. This stage is often associated with long-term negative effects. Thus, from this research it is apparent that there are important personal, positional, and organizational factors that contribute to the stress experienced by department chairs. From the literature hypotheses were generated.

Personal Influences

Age and Experience. Researchers have noted the importance of age-based differences in faculty stress (Fulton & Trow, 1974; Ladd & Lipset, 1975;

Gmelch, Wilke & Lovrich, 1986). An Australian study of faculty reported that younger faculty, in general, reported less stress than older faculty (Dua, 1994) and in a study of faculty in United States universities, as faculty received tenure and moved to higher academic ranks of associate and full professor, stress form *time constraints* and *professional identify* declined. Conventionally, therefore researchers believe that stress universally declines with chronological age.

Gender. Some evidence exists which suggests that women academics experience more stress, especially with respect to *time constraints* and *professional identity* issues (Gmelch, Wilke & Lovrich, 1986). However, the Australian study concluded that male and female faculty did not experience different levels of stress (Dua, 1994). With respect to academic administrators, Tung found that women administrators experienced less *role-based* and *conflict-mediation* stress than men (1980).

Inside versus Outside Appointment. While the research is silent with respect to investigations exploring the levels of stress experienced by department chairs selected from inside the department versus chairs selected from outside the institution, practically speaking, the nature of their stresses may be different. Obviously the inside candidate is better known to faculty, more knowledgeable about the department, better able to operate effectively for the initial period of appointment, and should add a sense of stability or continuity to the life and work of the department (Tucker & Bryan, 1988). On the other hand, the outside chair should be freer to bring in new ideas and insights, copes with more personal and professional change with the move to a new institution, and does not have the burden of previous political commitments and obligations.

Consistent with the previous discussion, the following hypotheses regarding the association of personal variables and stress are posited:

Hypothesis 1a: Female department chairs will experience more stress than male department chairs.

Hypothesis 1b: Older department chairs will experience less stress than younger department chairs.

Hypothesis 1c: Chairs with more experience in the position will experience lower levels of stress chairs with less experience.

Hypothesis 1d: Chairs appointed from outside the institution will experience more stress than those chosen from inside the institution.

Positional Influences

Role Conflict and Role Ambiguity. Department chairs often are confronted with situations requiring them to play a role that conflicts with their value systems, or play two or more roles in conflict with each other. In addition, the roles chairs must perform may not be clearly articulated in terms of behaviors or performance expectations. The former situation constitutes *role conflict* and the latter is *role ambiguity* (Kahn, Wolfe, Quinn & Snoek, 1964). In general, Kahn and his associates have isolated the constructs of role conflict and role ambiguity as important aspects of organizational stress. Studies built on Kahn's work have found that role conflict and ambiguity in various professions significantly affect personal stress (Van Sell, Brief & Schuler, 1981). Although these studies have indicated the stress-role conflict and ambiguity relationship, researchers have used a generic construct for stress without investigation into the specific dimensions of stress such as the chair stress factors.

Role Identification. As stated earlier, higher education scholars believe chairs fill an ambiguous role which hovers between faculty and

administration. Chairs attempt to bridge the managerial and academic cores of the university, which are organized and operated differently (Bare, 1964). The academic core of teaching and research operates freely and independently in a loosely-coupled system, whereas the managerial core maintains the mechanistic qualities of a tightly-coupled organization. The department chair is at the heart of the tension between the two systems and suffers from the role conflict inherent in the position (Booth, 1982). Thus, trapped between the stresses of performing not only as an administrator but faculty member as well, chairs orientation (as faculty member and/or administrator) may have a mediating effect on the type and intensity of stress they experience. One would assume that a chairs' orientation toward his or her job might have an impact on the nature of their stress, e.g. that chairs with a closer affinity or identification with faculty would have more stress dealing with faculty conflict than administration-oriented chairs.

Satisfaction with Chair Role. Researchers have presented evidence to show that job-related stress leads to poor physical and emotional health, absenteeism, low morale, and job dissatisfaction (Matteson & Ivancevich, 1987; Sutherland & Cooper, 1988). Dua's study of university faculty reconfirmed this finding and concluded that both high job stress and high non-work stress were associated with more job dissatisfaction (1994). With the degradation of research productivity during time as chair is cited as a dissatisfaction among chairs (Booth, 1982; Lee, 1985; McLaughlin, et al., 1975), one might expect to find a significant association between faculty role stress and job satisfaction.

Motivation to Serve. In a pervious CSDC study (1990), when chairs were asked "what motivated you to become a department chair?," responses fell into two categories. Some respondents indicated that they became chair

for extrinsic reasons (forced to take the job either by their colleagues or the dean or believed they had no other choice), and others took the position for intrinsic purposes (saw it as an opportunity to help either the department or themselves) (Gmelch & Miskin, 1993). When responses to the question of willingness to serve again were compared with motivations for becoming chair, intrinsically motivated chairs were three times as willing to serve again than extrinsically motivated chairs (75% versus 25% willing to serve again). Their experience with and the nature of their stress may have something to do with the chair's motives to serve.

Perceived Role Performance. Research investigating the relationship between job stress and productivity clearly indicate that performance is strongly related to stress (McGrath, 1970; Gmelch, 1983). Ashford (1989) in her presentation of a theoretical model to explain self-assessment notes that perception of performance is critical to improvement of task performance and self-regulation. Further, the nature of the self-assessment is related to depression (Beck, 1967), effort (Brockner, 1979), and emotional arousal (Miller, 1976). Each of these is associated with stress outcomes.

Discipline Orientation: Various strategies have been suggested to organize disciplines into categories that develop a theoretical foundation upon which to study discipline differences. Following Kuhn's (1970) suggestion that scientific fields are at different levels of technological development, a number of studies attempted to identify variation among departments based on paradigm development. Disciplines with more highly developed paradigms (commonly accepted set of problems of study and agreed upon methods for studying those problems) have come to be known as hard disciplines and those with less well developed paradigms as soft. When hard/soft classification is viewed as a dichotomy it appears to account

for differences among leadership orientation (Neumann & Boris, 1978) and length of chair tenure (length of tenure increases with level of paradigm development) (Pfeffer & Moore, 1980). Discipline orientation has been used as a significant tool for differentiating among disciplines and as a means for observing discipline dependent behaviors, including department chair behaviors (Smart & Elton, 1976). The disciplinary dichotomy of hard versus soft sciences was found to be a productive line of inquiry in the context of department functioning and academic behavior (Carroll, 1990).

Given the previous discussion, the following hypotheses are proposed:

Hypothesis 2a: The more ambiguous the role department chairs the greater the stress they will experience.

Hypothesis 2b: The greater the role conflict experienced by department chairs, the more stress they will experience.

Hypothesis 2c: Chairs who identify themselves more with administration will experience lower levels of stress than chairs who identify their orientation with faculty.

Hypothesis 2d: The greater the satisfaction with the role of chair the less stress chairs will experience.

Hypothesis 2e: Chairs who accept the position for intrinsic reasons will experience lower levels of stress.

Hypothesis 2f: Chairs who accept their position for extrinsic reasons will experience higher levels of stress.

Hypothesis 2g: The higher chairs perceive their performance the lower their level of stress.

Hypothesis 2h: Chairs in the hard disciplines will experience more stress than those in the soft disciplines.

Organizational Influences

Institutional and Departmental Ratings. Little research has investigated the relationship between chair stress and institutional and departmental quality ratings. However, there has been a great deal of research on institutional ratings relationship to student outcomes (Astin, 1984, 1985, 1992; Trow, 1988). Fairweather and Brown (1991) discuss and investigate several of the markers used to assess academic quality to determine those that are most significant. The results of their study revealed that student quality was a multi-layer construct differentiated by graduate and undergraduate issues. Faculty quality and prestige were found to be related. Finally, they argue that program quality is a multi-dimensional composed of institutional and program components related to size, resources, and prestige. Much of what department chairs do orbits around these issues. The contribution to stress experienced by chairs remains largely speculative.

Size of Department: Size of departments varies from disciplines and within institutions. From previous studies the average number of faculty per department ranges from 16 (McLaughlin, Montgomery & Malpass, 1975), 18.6 (Carroll, 1990) to 28.3 (Pfeffer & Moore, 1980). Pfeffer and Moore discovered that size served as a predictor of chair tenure–the larger a department, the shorter chair tenure. This effect becomes more pronounced as the level of paradigm development increases (from soft to hard sciences). Ryan (1972) demonstrated that organization of departments is dependent on size. That is, smaller departments tend to be run by consensus and have fewer committees, which are perceived to have very little influence. In larger departments (over 24 members) these characteristics are essentially reversed. Finally, Kremmer-Hyon and Avi-Itzhak (1986) found negative effects of department size on

chair job satisfaction. These studies provide hints to possible affects on department chair stress.

Given the previous discussion, the following hypotheses are proposed:

Hypothesis 3.a: Department chairs who rate their institution and department highly will experience lower levels of stress.

Hypothesis 3.b: The larger the size of the faculty the greater the stress chairs will experience.

Method

Sample

All research and doctorate-granting I and II institutions in the United States, classified by the Carnegie Commission on Higher Education (1987), comprised the universe of this study. Of these 237 institutions, 100 were randomly selected for the sample. For each institution, eight department chairs were randomly selected from a list of academic disciplines associated with each academic discipline group, e.g. hard vs. soft, pure vs. applied, life vs. non life (Biglan, 1973). Thus, 800 department chairs were sampled for the study.

The University Council for Educational Administration (UCEA) Center for the Study of the Department Chair at Washington State University sponsored the *1991 National Survey of Department Chairs in Higher Education*. The packet included a survey instrument, a cover letter and a business reply envelope. The major aspects of the Dillman (1978) *Total Design Method* were used in the design and distribution of the survey. After two mailings, 523 usable surveys were returned, representing a 66% usable survey return rate.

Measurements

The *1991 National Survey of Department Chairs in Higher Education* was comprised of five sections: the Chair Stress Index (Burns & Gmelch, 1992); the Administrative Role Questionnaire (Rizzo, House, & Lirtzman, 1970); Chair Tasks Inventory (Carroll & Gmelch, 1994); General Information; and Institutional and Departmental Ratings. Explanation of the instruments follows.

Chair Stress Index (CSI). The Chair Stress Index, developed and validated by Burns and Gmelch (1992), based on the Administrative Stress Index (ASI) (Gmelch and Swent 1984) and the Faculty Stress Index (FSI) (Gmelch, Lovrich, and Wilke, 1984), contains 43 stressors. Using a five point Likert-type scale of *rarely or never bothers me* to *frequently bothers me,* respondents indicate their perceived level of stress on each of the 43 items. From factor analysis by Burns (1992) five stress factors emerged: faculty role, role ambiguity, administrative relationship, perceived expectations and administrative task.

Factor 1, the stress factor associated with the greatest stress experienced by department chairs, was labeled *Faculty Role Stress*. The items in this stress factor describe the tasks, time commitments, recognition, and beliefs chairs have about their continuing responsibilities as faculty members. Five of the six items which make up the stress factor relate directly to the chair's role as a scholar engaged in research and publication activities.

Factor 2 was labeled *Administrative Relationship Stress*. The stress factor is comprised of items which reflect the chair's responsibility as the primary representative of the department to the administration as well as a conduit of information from the administration to the department. Six of the

items refer directly to the chair's relationship with the dean and other superior administrators.

Factor 3 was labeled *Role Ambiguity Stress* as it was comprised of items which reflect the relative uncertainty chairs have about the tasks they are to perform, the adequacy of the administrative training they have received, and concerns about the authority they have been given. The items associated with this stress factor can be summarized by questions associated with role ambiguity: What is the chair supposed to do? How does a chair do what needs to be done? And finally, do chairs have the training necessary to do the tasks associated with the position?

Factor 4 was labeled *Perceived Expectations Stress* as it was comprised of items which reflect the commitments and obligations chairs perceive as necessary to fulfill the expectations of their roles. The obligations represented by the items which make up this stress factor include additional social responsibilities and being present as the departmental representative at meetings and functions beyond normal working hours. These professional expectations coupled with high self-expectations and a desire to continue to make a contribution to their profession represent a combination of pressures chairs feel from their perceptions about the requirements and obligations of their position.

Factor 5 is labeled *Administrative Task stress* as it is made up of 14 items which relate to the administrative tasks of chairs. These tasks can be grouped into 4 subdivisions: Time consuming/tedious tasks; supervisory/conflict potential tasks; tasks associated with securing resources; and personal pressure associated with administrative tasks. The time consuming/tedious tasks consist largely of tasks associated with completing paperwork, attending meetings, and otherwise dealing with the bureaucratic

processes of institutions. The supervisory/conflict potential tasks were associated with evaluation, decision-making which affected the lives of people, handling student conflicts, and supervising and coordinating the tasks of many people. Preparing budgets, allocating resources, and trying to gain financial support for the department's programs are tasks associated with securing resources. Finally, two items relate to the personal pressures chairs feel from their administrative workloads. The general frustration chairs experience in their positions can be expressed in the items associated with having too heavy a workload and trying to make sense from their positions by seeking compatibility among institutional, departmental and personal goals.

Administrative Role Questionnaire. This 14 item instrument was developed by Rizzo, House and Lirtzman to determine the level of perceived role ambiguity and role conflict (1970). A psychometric evaluation of this instrument across six samples concluded that its use is warranted (Tracy & Johnson, 1981; Schuler, Aldag & Brief, 1977). Also a few studies using multiple methods have found agreement between the questionnaire and interview data on role conflict and ambiguity (e.g., Caplan, et. al., 1980).

Chair Task Inventory. Although a great deal of anecdotal literature discussing the chair role exists, surprisingly little empirical data is available to support these suppositions. In answer department chairs' perception of their performance, the 800 chairs in this study were asked to assess their perceived effectiveness in each of 26 chair duties (Smart & Elton, 1976; Moses & Roe, 1990; Carroll & Gmelch, 1994).

The responses to the Chair Task Inventory were factor analyzed using principal components with varimax rotation. Three factors explaining 39.28% of the total variance emerged. The factor loadings and percent

variance explained for each of these three factors are located on Table 1. The three factors are:

Factor 1: Manager, is composed of 13 items that measure duties that are typically identified in university administration.

Factor 2: Scholar, is defined by those activities chairs engage in to maintain their scholarship.

Factor 3: Faculty leadership, is created by items that measure the responsibilities to recruit, evaluate, encourage and support faculty.

Insert Table 1 here

Factor scores were generated for each of the factors by summing the scores for each item in the factor. Thus each chair received a manager score that ranged from a possible minimum of 12 to a possible maximum of 60. Chair also received a factor scale score for scholarly activities and faculty leadership that ranged from a possible low of 5 to a possible high of 25 for the former and a possible minimum of 9 to a maximum of 45 for the latter. The means and standard deviations for these need to be computed and placed here.

General Information. Chairs were asked to indicate personal information such as age, gender, years of service in position, and inside verses outside appointment. A role identification question asked chairs to indicate whether they consider themselves to be: (a) an academic faculty member; (b) an administrator; or (c) equally a faculty member and an administrator. Further, chairs were asked: "How satisfied they were with your chair position with regard to: the amount of work you are expected to do; the pace of your work; and your current work load." Responses were provided on a five point scale from *dissatisfied* to *satisfied*, thus measuring

elements of satisfaction with position. With respect to motivation, chairs were asked to select from six items (three extrinsic and three intrinsic) which best described why they became chair. Finally, chairs were requested to indicate the name of their department, the number of tenured faculty, non-tenured faculty, and adjunct or part-time faculty.

From the above information the following data transformations occurred to reduce the number of variables. Firstly, two variables (intrinsic and extrinsic) were constructed by adding separately the responses to the three intrinsic items and the three extrinsic items that described why chairs accepted the position. A total faculty variable was created by adding the number of tenured, non-tenured, and adjunct or part-time faculty. From the department name the eight cell Biglan classification was reduced to the dichotomous variable of hard soft. Finally, the three satisfaction items were summed to create a total satisfaction variable.

Organizational and Departmental Ratings. In this section of the questionnaire chairs were requested to rate seven aspects of their institutions on a five point Likert-type scale of *poor* to *excellent*. Chairs were also asked to rate four departmental areas on the same Likert-type scale. Finally, chairs were asked on a five point scale how they felt about the university as a place to work and how they viewed the facilities provided to accomplish tasks.

These 13 items were investigated using principal components factor analysis with varimax rotation. The results are presented in Table 2. Also presented in Table 2 are the factor loadings scores and the variance explained for each factor respectively. Three factors emerged that explain 54.10% of the total variance. The three factors are:

Factor 1: *Institutional rating* contains items that measured the chairs perception of the quality of the university at the institution level.

Factor 2: *Faculty relationships* possesses items that relate to quality of the faculty.

Factor 3: *Student concerns* contains items that rates the quality of the students and the quality of instruction at the graduate and undergraduate levels.

Insert Table 2 here

Factor scores were generated for each of the factors by summing the scores for each item in the factor. Thus, each chair received a institutional rating score that ranged from a possible minimum of 6 to a possible maximum of 30. Each chair received a factor scale score for faculty relationships and student concerns that ranged from a possible low of 3 to a possible high of 15.

Results

Demographics

The mean age of department chairs was 50.38 years, ranging from 34 to 70. Ten percent of the respondents were female, 88% male and 9 chairs left the gender question blank. Most chairs were married (88.5%), with no children at home (54%). Consistent with previous studies of department chairs at research and doctoral universities, few people of color were serving as chair (4.8%). On the average, respondents had six years experience as chair, almost all chairs were tenured (91.7%), held the rank of full professor (78.8%), and 23.9% of the chairs came from outside the institution, and 75.3% from inside. The average department size was 15 tenured faculty and 5 untenured.

Correlation Analysis

First, correlations and means are presented in Table 3, which measure the strength and direction of the association between the five stress variables and the personal, positional, and organizational variables identified in the literature review. Hypothesis 1a and 1c were not supported, there were no significant associations between any of the stress factors with the variables of gender or years of service. Further, the results of the analysis reveal that age is not associated with the stress experienced by chairs except for administrative relations ($p<.05$). The positive association indicates that as age increases the administrative relations stress increases. Thus, hypothesis 1b is largely unsupported. The final hypothesis 1d was also shown to lack support. From this sample it appears that being appointed from the outside of the institution is associated with increased feelings of role ambiguity stress ($p<.05$), but with none of the other stress factors.

The hypotheses concerning the relationship between the stress factors and the positional variables receive greater support than the personal. Hypotheses 2a, 2b, and 2d are clearly supported. The less role ambiguity, role conflict, and more satisfaction derived from the position the less chairs experience stress across all five factors ($p<.001$). Hypothesis 2g is also supported. Specifically, a significant negative relationship was found between perception of effective managerial performance and a lower level of administrative task stress ($p<.05$). Perception of effective scholar performance was found associated with lower levels role ambiguity stress ($p<.01$) and administrative task stress ($p<.05$). Perceived effective faculty leadership performance possesses negative relationships with faculty role stress ($p<.05$), administrative relationship stress ($p<.001$), perceived expectation stress ($p<.05$), and administrative task stress ($p<.001$). The final positional

hypothesis that received support, hypothesis 2f, indicates that chairs who accept the position for extrinsic reasons experience greater levels of faculty role stress ($p<.05$).

The other positional hypotheses 2h, 2e, and 2c were not supported from this analysis. Indeed, a positive relationship was found between the soft disciplines and perceived expectations stress ($p<.01$), rather than with the hard disciplines. Further, intrinsic reasons for accepting the position of department chair were associated with higher faculty role stress ($p<.05$) and administrative task stress ($p<.05$), rather than the predicted lower levels. Finally, identification with faculty, hypothesis 2c, was not found associated with higher levels of stress on any of the five factors.

The correlations show support for organizational hypotheses 3a. Specifically, chairs who rate their institutions highly experience lower levels of faculty role stress ($p<.001$), administrative relationship stress ($p<.001$), role ambiguity stress ($p<.001$), and administrative task stress ($p<.001$). A significant association was not located between institutional ratings and perceived expectation stress. The faculty rating factor was found to be negatively associated with the following stress factors; administrative relationship ($p<.001$), role ambiguity ($p<.001$) and administrative task ($p<.05$). Thus the higher the rating of the faculty the lower the stress experienced on these factors. The higher the rating given to meeting issues related to students the lower the stress experienced by department chairs except for perceived expectations. When issues that involve meeting student needs are being meet chairs experience lower levels of faculty role stress ($p<.05$), administrative relationship stress ($p<.01$), role ambiguity stress ($p<.01$), and administrative task stress ($p<.05$). The size of the faculty was found to be significantly and negatively associated with administrative relationship

($p<.05$) but with none of the other stress factors. Thus, hypothesis 3b is rejected.

Multiple Regression

Standard multiple regression through the multivariate general linear model was used to compute the predictive models for the five stress factors. The analysis was performed using SYSTAT 5.1 (Wilkinson, 1986). Assumptions of variable normality, linearity, homoscedasticity of residuals were tested and no serious violations were identified. The 17 independent variable were analyzed for their contribution to each of the five stress factors.

The results of the multiple regression analysis are present in Table 4, showing the standardized regression coefficients for the independent variables, the R^2, and the multiple R and F -ratio for the models generated for each of the dependent stress variables. The results show that three independent variables possessed significant and unique contribution to faculty role stress; intrinsic reasons for accepting the position, total satisfaction with the position, and role conflict ($ß=0.09$, $p<0.05$; $ß=0.21$, $p<0.000$; $ß=0.19$, $p<0.000$ respectively). Years of service, intrinsic reasons for accepting the position, perceived performance as a manager, the rating of the institution, total satisfaction with position, role ambiguity, role conflict, and discipline classification were found to significantly and uniquely contribute to administrative relationship stress, explaining 41% (39% adjusted) of the total variance, experienced by chairs. A large percent of the total variance explained, 27% (25% adjusted), was found for role ambiguity stress. The four variables of perception of performance as a manager, perception of performance as a faculty leader, role ambiguity and role conflict ($ß=0.16$, $p<0.000$; $ß=0.19$, $p<0.000$; $ß=0.23$, $p<0.000$; $ß=0.22$, $p<0.000$ respectively), appear to be most salient. Perceived expectations stress was found to be associated

with four variables of intrinsic reasons of accepting the position, total satisfaction with position, role conflict and discipline classification, which explain 16% (14% adjusted) of the total variance. Finally, the variables of intrinsic reasons for accepting position, perceived performance as a faculty leader, total satisfaction with the position, and role conflict was found to explain 33% (31% adjusted) of the total variance for administrative task stress.

Discussion of Results

Monolithic Dimensions of Department Chair Stress

Personal Influences. Prior research on faculty stress have revealed that the amount of perceived stress varies by age, experience and gender (Dua, 1994; Gmelch, Wilke & Lovrich, 1986). With respect to department chairs in this study, none of the stress factors responded to differences in age or experience. One might expect that *administrative tasks* and *perceived expectations*, similar to the faculty stress factors, should have a mediating influence on reducing the stress experienced by chairs, but it did not.

In addition, results and conclusions regarding stress and gender remain confusing and confounding. Based on studies in higher education, one would expect women academics to experience more stress. Also, previous research found women faculty are provided with less support, recognition, and interaction (Kanter, 1977; Koontz, 1979; Lynch, 1973), thus, one would expect that women department chairs would experience more stress in some of their job dimensions. The current study found no significant difference in any of the chair stress dimensions. While studies still need to investigate differences with respect to gender, the issue is clearly more complex than gender alone. The answer may rest more in the administrative styles attributed to each gender rather than gender itself. For example, androgynous

administrators in other studies have shown less stress than masculine or feminine oriented administrators (Torelli & Gmelch, 1993).

Overall, the results of this study indicate that with respect to personal variables, stress among department chairs appears to be *monolithic* in its effect. No differences were found among men and women chairs, age differences of chairs, or experience of chairs (with the exception of administrative relationships discussed in the next section). The clues to differential influences of department chair stress seems to rest more in the position itself, rather than the person in the position.

Positional Influences. Chairs come to their position without leadership training; without prior administrative experience; without a clear understanding of the ambiguity and complexity of their role; and without recognition of the metamorphic changes that occur as one transforms from a professor to a chair. While conflicting roles of department chairs have received some attention lately from anecdotal speeches, professional papers, and professional journal articles, few data-based studies have investigated the chair's positional dilemma. Researchers know more about the "motives, habits, and most intimate arcania of the primitive peoples of New Guinea or elsewhere than (they) do of the denizens of the executive suites" (Mintzberg, 1973).

In this study 17 variables were analyzed for their contribution to the factors of faculty stress. Of the 23 relationships which showed significance in Table 4, 21 of the associations occurred due to the nature of the department chair position. The two most common and most significant contributions to stress factors were job satisfaction (true of all except role ambiguity stress) and role conflict (significant in all five factors). One might postulate that these variables had a significant but similar "monolithic" effect on stress since

almost all aspects of chair stress were influenced. That is, role conflict impacted the level of stress chairs experience from performing their faculty role, relationship with administration, administrative tasks, ambiguous roles, and perceived expectations. In addition, chairs experienced greater job satisfaction if they had less stress in all these areas, except role ambiguity.

While less influential, chairs' intrinsic motivation to serve as administrators also contributed significantly to the regression equation on four of the five stress factors. Contrary to what was hypothesized, it appears that if chairs accept the position for intrinsic reasons (for personal development, opportunity and/or to be in more control of their environment), they experience more stress. This may be consistent with what Wentz has recently discovered in her research on chairs who are committed to their position. What "committed" chairs seem to have in common is "a sense of naiveté when accepting the position . . . all were surprised that they spent more time with minutiae than with the substantive missions that they intended to devote their time to. They were also shocked by the length of time it took to accomplish their objectives" (1995, p. 84). In essence, chairs who accept the position for intrinsic reasons may take their roles more seriously and become frustrated by the unexpected administrivia and time commitment it takes to get the job done properly. In the end, Wentz discovered that as chairs experienced these setbacks they had to persevere in order to maintain their commitment to academic leadership.

Organizational Influences. While modestly significant correlations were found between institutional/faculty ratings and stress factors (Table 3), only institutional ratings contributed significantly to one stress factor, administrative relationships, in the multiple regression equation. Thus, the higher the perceived quality and rating of the institution the less stress chairs

experienced with their relationship with their dean. High institutional prestige, therefore, may serve as a stress buffer between the dean and department chair, a topic which will be discussed further in the next section.

Multidimensionality of Department Chair Stress

The generic measures of stress used in previous studies have not been sensitive to the specific dimensions of stress influenced by personal, positional or organizational variables. Some have argued that unless stress is tested as a multidimensional construct, little progress will be made in determining its link with other variables (Koch, Tung, Gmelch & Swent, 1982). Therefore, it is necessary to separate the dimensions of stress and not treat stress as a unidimensional construct. As such, each of the department chair stress factors reflected different patterns of influence.

Administrative Relationship Stress. The administrative relationships stress factor is characterized by the chair's primary relationship with the dean: the chair having sufficient authority, resolving conflicts with the dean, influencing decisions by the dean, and receiving recognition and salary, as well as the dean evaluating the chair. Seven independent variables contributed 41% of the variance in the area of administrative relationships.

First, role conflict and role ambiguity explained a significant level of administrative relationship stress. The role conflict created in the chair's working relationship with the dean primarily emanated from such situations as working on unnecessary things, receiving assignments without proper staffing or resources, and bucking rules to carry out assignments. Chair's role conflict also stems from incompatible requests: having to work with two or more groups who operate differently and receiving incompatible requests from two or more people. On the other hand, role ambiguity influences administrative relationships by the very nature of unclear expectations,

unknown responsibilities and authority, unclear goals, and unexplained direction as to what has to be done. Clearly the role of department chair is wrought with conflict and ambiguity, creating tension between the chair and the dean. Subsequently as these administrative relationships increase stress, department chairs' job satisfaction and managerial performance declines. If institutions want to reduce the stress from department chairs' administrative relationships, the role and expectations must be clarified, possibly even requiring a redesign of the chair position.

A smaller, but still significant contribution to administrative relationship stress is attributed to the chair's intrinsic motivation to serve. In fact, this stress does not decline with experience but tends to elevate, painting the classic picture of the battle between the dean and senior, tenured faculty member serving as chair.

On a positive note, administrative relationships stress decreases as one's institutional rating increases. One might assume that as the chair benefits from greater departmental prestige, the dean may have less authoritative influence over the direction of the department. The prestige factor may insulate the department from the dean's influence, such that the dean may show support for prestigious programs, expressing more loosely than tightly coupled ties to department administration.

Role Ambiguity Stress. Role ambiguity stress is unique in that it is not differentiated by the independent variables of job satisfaction and intrinsic motivation as are the other four factors. What is predictable is the significant contribution of role conflict and ambiguity variables to the role ambiguity stress variance. This substantial correlation may be explained psychometrically: essentially the stress factor and independent variables may be assessing the same dimension of the chair position. The eight items of the

conflict scale are all worded to represent stressful (i.e., conflict-laden) characteristics of the role. Therefore, a high score on these items indicates feelings of role stress (Tracy and Johnson, 1981). Both scales address the issues of too much or unclear responsibility, not enough information to carry out the job, and others don't understand the chair's goals and expectations.

One of the most interesting results from the multiple regression equation is the significant relationship between department chair performance and role ambiguity stress. Role ambiguity is the only stress factor showing an influential relationship with two chair performance areas, management and faculty leadership. Clearly, department chair's stressful feelings of "being inadequately trained to handle the job", "too much responsibility delegated by the dean", "inability to get information to carry out the job", and "misunderstanding of the chair's goals and expectations" contribute to the chair's perception of low performance in handing the management responsibilities of the position and providing the appropriate faculty leadership. If deans expect department chairs to perform well, then the role ambiguity inherent in the chair position needs to be addressed. Note that role ambiguity stress did not significantly impact the chair's perception of scholarly performance, something that professors have been socialized in doing for an average of 18 years prior to accepting the chair position (Carroll, 1990).

Administrative Tasks Stress. Besides the significant influences intrinsic motivation, job satisfaction and role conflict have on administrative tasks stress, the one other unique relationship is the impact administrative tasks stress has on chair's perception of their faculty leadership performance. Evidently the more department chairs feel frustrated by and tied up with writing memos, meeting paperwork deadlines, complying with rules and

regulations, attending meetings, seeking financial support, preparing budgets and generally coping with heavy workloads, the less effective they feel in providing leadership to faculty in terms of recruiting, evaluating, encouraging and providing support.

Faculty Role and Perceived Expectations Stress. Nothing appeared to be unique regarding the influence of independent variables on the faculty role and perceived expectations factors. The same three independent *positional* variables common to most stress factors (intrinsic motivation, job satisfaction and role conflict) were found to influence these stress factors. Collectively, these independent variables accounted for only 19% and 17% of the total variance, respectively.

In summary, while other studies have investigated two or three variables as they relate to stress, the uniqueness of this study is the use of multiple independent variables assessed and related to multiple factors of stress. This study used regression analysis to sift out the less influential variables and accentuate the most salient influences on stress. The association between independent variables and three of the stress factors were explained by 27% variance or more. Variances of 19% and 17% for faculty role stress and perceived expectations stress were explained by the plethora of independent variables; however, administrative relationships revealed the greatest variance at 41%. Not only is department chair stress consistently influenced by inherent imperfections in the role itself (role conflict and role ambiguity), but chairs who accept the position for intrinsic reasons become frustrated with most of the dimension of the position. Ultimately, certain dimensions of department chair stress impact not only their job satisfaction but their perceived performance as managers and faculty leaders. Personal and organizational variables have relatively little differential influence on

chair stress. In order to address the leadership crisis in higher education, colleges and universities need to focus on how to restructure the chair *position* to make it more attractive and productive.

Before drawing practical implications from this study, at least one limitation should be noted. This study is focused on research and doctorate granting institutions of higher education and the results should not be extrapolated to non-research colleges and universities. While most stress factors are generic to many types of institutions, the items which comprise the factor of faculty role stress many not be common to other institutions. However, the relative homogeneity of the sample institutions does allow generalizability to the population of all 237 doctorate and research universities.

Practical Implications

Different strategies must be taken for separate dimensions of stress in order to pave a more manageable road for department chairs. The time-pressure and ambiguity with which chairs travel their road must be modified in order to moderate the exhaustion and dissatisfaction experienced along the way. It is not just the pace (time pressures) of the travel but the ambiguous and conflicting directions which lead to their stress and dissatisfaction. To properly navigate and divert the turbulent road department chairs travel, they must be equipped with both a better **clock** and **compass** to redesign the map for the journey ahead.

Redesigning the Chair

Some of the design problems of the chair's journey are **structural** and inherent in the way colleges and universities are organized, while other design problems are **personal** and rooted in how chairs manage themselves. Higher education will continue to have a "leadership crisis" if the conditions

for chairing a department remain an unmanageable and unproductive avenue for faculty. The answers to attracting and retaining effective departmental leaders may be in reducing the ambiguity and conflict of the journey and how time is used during the venture. We must create conditions that make the chair more attractive, tenable and meaningful for promising professors. Following are some prescriptions for restructuring the chair experience. The themes are implied from quantitative results of the current study, with extrapolated ideas suggested from interviews with several department chairs after data analysis. We hope these practical suggestions will assist the scholar who also serves as an administrator.

Chairs must learn to have all four wheels balanced such that they **control their time, avoid the activity trap, develop a hardy personal profile**; and **build a golden parachute** to arrive safely after the journey into academic administration. If any one of these four wheels is deflated, flat, or out of balance, it affects the utility and effectiveness of the other three, and the travel of the entire journey.

1. Control Chair Time: Chairs must be taught to take time to learn-- to save time. They must develop a more efficient working environment so that routine paperwork can be handled by office assistants, telephone calls can be screened, and time can be blocked into uninterruptible periods for reflective work. Listed below are a few time savers some chairs have suggested from our interviews.

- **Develop a dictation habit**. One of our colleagues swears by the dictaphone. "I dictate all my correspondence and memos. It saves time but also saves physical wear and tear. . . You can do it with your feet up on the desk, you can do it walking around the office, or you can go outside and walk

around the campus grounds. You can't do that when you're typing." He then drops off the tape for his support staff to type and follow up.

- **Get hooked on internet.** While many do not swear by it, electronic mail allows chairs to keep in touch economically and efficiently. Chairs just need know how to separate the treasure messages from the trash.
- **Separate work and non-work activities.** One of the most difficult challenges chairs face is to leave the administrative work in the office at the end of the day. As noted in earlier, when professors move into the position of department chair, they develop dissatisfaction from their loss of time for scholarship and personal time for family and friends. Chairs need to separate their administrative from their scholarly work, and their profession from their personal lives.

2. Manage the Activity Traps: Chairs seem to fall into an endless activity trap. As already noted, chairs' work is characterized by brevity, variety and fragmentation: what seems to be a bottomless activity trap. When managers asked where their problems lay, they typically cite *externally imposed* time wasters such as endless meetings, unrealistic demands from the dean, interruptions, drop in visitors and so on. However, upon further discussion, they realize that their true time wasters were *self-imposed* -- unrealistic time estimates, failure to delegate, lack of planning, unclear vision, self-interruptions, and lack of concentration (Mckenzie, 1990). The challenge, then is to focus on what is important.

- **Concentrate on HIPOs.** How can chairs avoid the activity trap? The typical time-saving scenario begins by listing tasks in the most efficient order. The trouble with this "to do" list mentality is that this does not help chairs eliminated any tasks, just reordered them. Instead, chairs should begin by putting away their "to do" lists and begin with only three

or four "make or break", high payoff (HIPO) tasks. Every activity facing chairs seems important, but the choice of where chairs spend their time should be focused in the HIPO areas of faculty development, leadership, management and scholarship.

- **Delegate/Eliminate LOPOS.** Most chairs will not have difficulty identifying their HIPOS. But how they really break out of the activity trap is to make sure they don't just identify HIPOS but eliminate low payoff (LOPO) activities they are currently doing such as excessive committee work and administrivia.

3. **Maintain a Hardy Profile:** Under the pressure to travel the administrative journey, why do some chairs cope while other collapse? A few clues from psychological research have emerged help account for this resilience in management (Pines, 1980). Resilient managers believed they were more in control of the events in their lives, had a greater sense of commitment to life beyond their profession, and viewed changes as challenges. To their three qualities we have added a fourth, humor.

- **Develop a Commitment to your Profession and Community.** Hardy chairs travel well by finding balance in their discipline and their personal life. They actively seek opportunities and options in their academic careers while maintaining their dedication to their family and community.

- **See Change as Challenge.** Hardy chairs see problems as opportunities or a challenges. This challenge, however, is not met without restraint. They take risks, though not excessively, and feel that if they are not making a mistake every now and then they are not really trying new opportunities. Change can be the spice of their lives, if they handle it right.

- **Take Control of their Destiny.** Hardy chairs believe they can have an impact on their department and college. Rather than thinking the bureaucracy or legislature controls their destiny, they identify and try to impact the events under their control.
- **Seek the Humor in the Situation.** Hardy chairs take their jobs seriously, but themselves lightly. They believe that whoever laughs, lasts. They approach crises with a little levity which tends to calm the emotions and helps one find new and creative solutions for academic problems. Fun frees the mind. Humor, never leave home without it!

4. Build Yourself a Golden Parachute: First, and foremost, upon accepting the job, chairs should negotiate a sabbatical between terms or at the end of the term to regain currency in your discipline. The most significant and most overlooked responsibility chairs have is to their own personal growth and career development. This critical source of motivation typically is left to the inertia of the past faculty role, the happenstance of the present chair role, or the whim of an unknown future role. In order to assess their next journey after being a department chair, they must delve into their past, assess the present, and plan for the future. Remember, on the average chairs spend six years in their administrative journey, with 65% of the chairs returning to faculty status and only one in five chairs continue in the path of administration.

Have Chairs Left a Legacy?

Whether they return to faculty status or move on into academic administration, chairs' terms do end. William Jenning Bryan once commented: "Destiny is not a matter of chance, it is a matter of choice; it is not a thing to be waited for, it is a thing to be achieved." How are chairs

remembered by their colleagues? Did they make a difference? Did they leave a legacy?

We asked hundreds of department chairs to reflect on this question and they responded in enlightened ways (Gmelch & Miskin, 1993). Some hoped they would be known for their role in **faculty development**: recruiting competent faculty, promoting women and minorities and nurturing young faculty members. They wanted to be noted for improving the sense of collegiality where conflicts were healed, morale enhanced, and peace brought to the department. Others wanted to be known for their vision in building a national program, enhancing the department's reputation, and **leading** the department into the 21st century. Some chairs saw their legacy in the **manager role**, by depicting maintaining their programs under rough seas: "the ship is still afloat" and "I kept a leaking life boat afloat without throwing anyone to the sharks." Simply stated, they "held the fort," "kept the place from falling apart," and maintained the program in time of major financial crisis." Finally, chairs hoped that they would be respected for their personal qualities: honesty, openness, fairness, justice and altruism. Obviously, these legacies reflect three of the department chair roles, recognition for one's **scholarship** curiously went unmentioned by any of the chairs.

A legacy is built on sustained dedication, a strong commitment, and a clear purpose. Are faculty willing to journey long enough to transcend the managerial role and develop strong leadership for their department? One chief executive officer commented: "No executive who begins (a) journey and gives up after three years will ever live to tell a positive story."

Nothing can substitute for leadership in times of change and chaos in higher education. The time for amateur administration is over. The call for department leadership and the challenge to respond to this call needs both a

compass to reduce the ambiguity and a clock to tell how to use one's time effectively. We hope this paper has not only helped add to the research base on the department administration (in appropriate AERA fashion), but also provided some guidance to faculty as they contemplate the journey into academic leadership.

Table 1 Factor analysis of effective performance variables

Variables	Factor loadings 1 Man.	2 Scho.	3 Fac.
Coordinate department activities with constituents	0.665		
Inform faculty of department, college, and university concerns	0.610		
Assure the maintenance of accurate departmental records	0.602		
Plan and evaluate curriculum development	0.583		
Manage non-academic staff	0.554		
Solicit ideas to improve the department	0.544		
Participate in college and university committee work	0.521		
Plan and conduct departmental meetings	0.507		
Manage departmental resources (finances, facilities, equipment)	0.425		
Prepare and propose budgets	0.443		
Assign teaching, research and other related duties to faculty	0.479		
Represent the department at professional meetings	0.394		
Teach and advise students	0.343		
Maintain research program and associated professional activities		0.852	
Obtain resources for personal research		0.839	
Remain current within academic discipline		0.722	
Obtain and manage external funds (grants, contracts)		0.619	
Select and supervise graduate students		0.469	
Recruit and select faculty			0.650
Encourage faculty research and publication			0.580
Maintain conducive work climate (reducing conflicts among faculty)			0.576
Provide informal faculty leadership			0.572
Encourage professional development efforts of faculty			0.565
Represent department to the administration			0.541
Develop and initiate long-range departmental goals			0.537
Evaluate faculty performance			0.531
Percent of total variance explained after rotation	14.874	11.208	13.197

Table 2 Factor analysis of organizational variables

Variables	Factor loadings 1 Inst.	2 Fac.	3 Stu.3
This university offers me the facilities I need to do what I like to do	0.709		
I think that this university is a good place for a professional to work	0.668		
Rate your institutions' quality of administration	0.663		
Rate your institutions' faculty salaries	0.642		
Rate your institutions' intellectual climate	0.552		
Rate your institutions' academic standing among other institutions	0.540		
Rate the personal relations among faculty in your department		0.843	
Rate the relations with students in your department		0.768	
Rate the quality of faculty in your department		0.532	
Rate your institutions' quality of graduate instruction			0.728
Rate the academic ability of students in your department			0.624
Rate your institutions' quality of undergraduate instruction			0.573
Percent of total variance explained after rotation	21.103	14.409	18.595

Table 3 Correlations of five stress factors with independent variables

	Means	Faculty Role	Admin. Relation	Role Ambiguity	Perceived Expect.	Admin. Task
Age	50.38	-0.006	0.109*	-0.039	-0.003	-0.019
Gender		0.022	-0.006	-0.030	0.001	-0.026
Years of service	6.32	-0.051	0.048	-0.069	-0.072	0.020
Inout		0.019	0.063	0.089*	0.061	0.032
Intrinsic	1.13	0.093*	0.080	0.015	0.081	0.097*
Extrinsic	1.04	0.086*	-0.001	0.045	0.011	0.074
Faculty vs. Admin.	1.61	-0.026	0.056	0.061	0.080	0.020
Total satisfaction	8.77	-0.338†	-0.378†	-0.255†	-0.294†	-0.456†
Role ambiguity	4.38	-0.243†	-0.376†	-0.385†	-0.193†	-0.296†
Role conflict	4.12	0.323†	0.485†	0.374†	0.296†	0.458†
Manager	39.16	-0.041†	0.066	-0.032	-0.006	-0.104*
Scholar	15.31	-0.080	-0.070	-0.119§	-0.026	-0.127§
Faculty leader	35.29	-0.090*	-0.074	-0.232†	-0.109*	-0.173†
Hard soft		-0.073	0.083	0.062	0.141§	-0.033
Rate institution	20.46	-0.205†	-0.418†	-0.238†	-0.066	-0.277†
Rate faculty	11.90	-0.069	-0.169†	-0.211†	-0.059	-0.112§
Rate student	10.81	-0.095*	-0.122§	-0.132§	0.029	-0.110*
Total faculty	20.94	-0.057	-0.090	-0.041	-0.019	-0.023

*p<0.05; §p<0.01; †p<0.001.

Table 4 Multiple Regression of Stress Factors

	Faculty Role	Administrative Relationships	Role Ambiguity	Perceived Expectations	Administrative tasks
	Beta	Beta	Beta	Beta	Beta
Gender	0.00	0.03	0.04	0.02	0.05
Years of service	0.02	0.08*	0.01	0.04	0.07
Inout	0.05	0.00	0.07	0.02	0.03
Intrinsic	0.10*	0.07*	0.02	0.08*	0.10§
Extrinsic	0.09	0.01	0.04	0.03	0.07
Fac. vs. admin.	0.01	0.02	0.03	0.06	0.04
Total satisfaction	0.21†	0.15†	0.05	0.21†	0.28†
Ambiguity	0.08	0.19†	0.24†	0.03	0.05
Conflict	0.19†	0.27†	0.22†	0.19†	0.29†
Manager	0.06	0.16†	0.16†	0.06	0.02
Scholar	0.03	0.04	0.01	0.06	0.01
Faculty leader	0.04	0.05	0.19†	0.05	0.10*
Hard soft	0.08	0.08*	0.01	0.11§	0.04
Rate institution	0.04	0.26†	0.06	0.02	0.08
Rate faculty	0.03	0.05	0.07	0.01	0.03
Rate student	0.05	0.01	0.03	0.05	0.02
Total faculty	0.07	0.03	0.02	0.01	0.02
R^2	0.19	0.41	0.27	0.17	0.33
R	0.44 F=7.01†	0.64 F=20.36†	0.52 F=10.81†	0.41 F=5.87†	0.57 F=14.52†

*p<0.05; §p<0.01; †p<0.001.

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